Substitute Sequence Listing

<110> SCHUIJFFEL, Danielle Francisca
NUIJTEN, Petrus Johannes Maria

<120> Ornithobacterium rhinotracheale subunit vaccines

<130> I-2004.011 US

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<150> PCT/EP2005/050577
<151> 2005-02-09

<150> EP 04075427.7
<151> 2004-02-11

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ggc gac atc tta gcc gaa atc gaa aca gat aaa gcg gtt caa gaa ttt      144
Gly Asp Ile Leu Ala Glu Ile Glu Thr Asp Lys Ala Val Gln Glu Phe
        35                  40                  45

gaa aca gat gta gaa ggt act ctt tta tac atc ggt gta gag gct ggt      192
Glu Thr Asp Val Glu Gly Thr Leu Leu Tyr Ile Gly Val Glu Ala Gly
    50                  55                  60

caa gca gca cca gtt gat agt att tta gct atc atc ggt gca gaa ggc      240
Gln Ala Ala Pro Val Asp Ser Ile Leu Ala Ile Ile Gly Ala Glu Gly
65                  70                  75                  80

gaa gac atc agc ggt ttg gta agc ggt gga ggt gct agc caa tca gcg      288
Glu Asp Ile Ser Gly Leu Val Ser Gly Gly Gly Ala Ser Gln Ser Ala
                85                  90                  95

cca gct caa gaa gct gcc gct cct gca gaa gaa cca caa gcg gaa gct      336
Pro Ala Gln Glu Ala Ala Ala Pro Ala Glu Glu Pro Gln Ala Glu Ala
            100                 105                 110

gca cca gcg gct gaa gtt cca gaa aat gta act atc gtt tct atg cca      384
Ala Pro Ala Ala Glu Val Pro Glu Asn Val Thr Ile Val Ser Met Pro
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        115                 120                 125

aga ttg agc gat acc atg gaa gaa ggt aaa gta gaa tct tgg aac aaa      432
Arg Leu Ser Asp Thr Met Glu Glu Gly Lys Val Glu Ser Trp Asn Lys
    130                 135                 140

aaa gta gga gat aaa gta tca tac ggc gac atc tta gcc gaa atc gaa      480
Lys Val Gly Asp Lys Val Ser Tyr Gly Asp Ile Leu Ala Glu Ile Glu
145                 150                 155                 160

aca gat aaa gcg gtt caa gaa ttt gaa aca gat gta gaa ggt act tta      528
Thr Asp Lys Ala Val Gln Glu Phe Glu Thr Asp Val Glu Gly Thr Leu
                165                 170                 175

tta tat ata ggt gta gaa gct ggg caa tca gca cca gtt gat agc att      576
Leu Tyr Ile Gly Val Glu Ala Gly Gln Ser Ala Pro Val Asp Ser Ile
            180                 185                 190

ttg gca atc atc gga cct gaa gga aca gat gtt tct gca atc gta gca      624
Leu Ala Ile Ile Gly Pro Glu Gly Thr Asp Val Ser Ala Ile Val Ala
        195                 200                 205

gga ggt ggt gca aaa cca gct gct aaa gcg gaa gct cca aag gct gaa      672
Gly Gly Gly Ala Lys Pro Ala Ala Lys Ala Glu Ala Pro Lys Ala Glu
    210                 215                 220

gca cct aag caa gct gct cca gca caa gag aaa aaa gaa act cca gcg      720
Ala Pro Lys Gln Ala Ala Pro Ala Gln Glu Lys Lys Glu Thr Pro Ala
225                 230                 235                 240

cct gct gct cca aaa gca caa gct acc aac aat tca ggt aga gta ttt      768
Pro Ala Ala Pro Lys Ala Gln Ala Thr Asn Asn Ser Gly Arg Val Phe
                245                 250                 255

att tct cca ttg gct aaa aaa ttg gct gat gaa aaa gga tac gat atc      816
Ile Ser Pro Leu Ala Lys Lys Leu Ala Asp Glu Lys Gly Tyr Asp Ile
            260                 265                 270

aat caa att caa ggt aca gga gac aac gga aga atc atc aaa aaa gat      864
Asn Gln Ile Gln Gly Thr Gly Asp Asn Gly Arg Ile Ile Lys Lys Asp
        275                 280                 285

gtt gaa aac ttt act cca caa gct gct gcg gct aag cca gct gtt gct      912
Val Glu Asn Phe Thr Pro Gln Ala Ala Ala Ala Lys Pro Ala Val Ala
    290                 295                 300

ggt cca gtt gca ttg gaa gta gga gaa gat act gta atc cct aac tct      960
Gly Pro Val Ala Leu Glu Val Gly Glu Asp Thr Val Ile Pro Asn Ser
305                 310                 315                 320

caa atg aga aaa gtg att gct aag cgt ctt tct gaa agt aaa ttt aca     1008
Gln Met Arg Lys Val Ile Ala Lys Arg Leu Ser Glu Ser Lys Phe Thr
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gca cca cac tac tac tta acc att gaa gta gat atg gat aat gtg atg     1056
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Val Val Asn Ser Thr Trp Lys Asp Asn Glu Ile Val Gln Tyr Ala Ala
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Val Asn Ile Gly Val Ala Val Ala Val Pro Asp Gly Leu Val Val Pro
                405                 410                 415

gta gtg aaa aat aca gat tta aaa tca tta tct caa att tct gct gag     1296
Val Val Lys Asn Thr Asp Leu Lys Ser Leu Ser Gln Ile Ser Ala Glu
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        435                 440                 445

gag atg gaa ggt tct acc ttt aca gtt tct aac cta gga gct tac ggt     1392
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gtg gac gga gca act gga agt act ttc cta caa act tta aaa caa tac     1584
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Glu Asp Ile Ser Gly Leu Val Ser Gly Gly Gly Ala Ser Gln Ser Ala
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Pro Ala Gln Glu Ala Ala Ala Pro Ala Glu Glu Pro Gln Ala Glu Ala
100 105 110

Ala Pro Ala Ala Glu Val Pro Glu Asn Val Thr Ile Val Ser Met Pro
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Arg Leu Ser Asp Thr Met Glu Glu Gly Lys Val Glu Ser Trp Asn Lys
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Lys Val Gly Asp Lys Val Ser Tyr Gly Asp Ile Leu Ala Glu Ile Glu
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Thr Asp Lys Ala Val Gln Glu Phe Glu Thr Asp Val Glu Gly Thr Leu
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Leu Tyr Ile Gly Val Glu Ala Gly Gln Ser Ala Pro Val Asp Ser Ile
180 185 190

Leu Ala Ile Ile Gly Pro Glu Gly Thr Asp Val Ser Ala Ile Val Ala
195 200 205

Gly Gly Gly Ala Lys Pro Ala Ala Lys Ala Glu Ala Pro Lys Ala Glu
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Ala Pro Lys Gln Ala Ala Pro Ala Gln Glu Lys Lys Glu Thr Pro Ala
225 230 235 240

Pro Ala Ala Pro Lys Ala Gln Ala Thr Asn Asn Ser Gly Arg Val Phe
245 250 255

Ile Ser Pro Leu Ala Lys Lys Leu Ala Asp Glu Lys Gly Tyr Asp Ile
260 265 270

Asn Gln Ile Gln Gly Thr Gly Asp Asn Gly Arg Ile Ile Lys Lys Asp
275 280 285

Val Glu Asn Phe Thr Pro Gln Ala Ala Ala Ala Lys Pro Ala Val Ala
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Gly Pro Val Ala Leu Glu Val Gly Glu Asp Thr Val Ile Pro Asn Ser
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Gln Met Arg Lys Val Ile Ala Lys Arg Leu Ser Glu Ser Lys Phe Thr
325 330 335

Ala Pro His Tyr Tyr Leu Thr Ile Glu Val Asp Met Asp Asn Val Met
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Ala Ala Arg Lys Gln Ile Asn Gln Ile Pro Asn Thr Lys Val Ser Phe
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Asn Asp Ile Val Leu Lys Ala Thr Ala Met Ala Val Lys Lys His Pro
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Val Val Asn Ser Thr Trp Lys Asp Asn Glu Ile Val Gln Tyr Ala Ala
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Val Asn Ile Gly Val Ala Val Ala Val Pro Asp Gly Leu Val Val Pro
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Val Lys Asp Leu Ala Thr Arg Ser Arg Asp Arg Lys Ile Lys Ala Asp
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Glu Met Glu Gly Ser Thr Phe Thr Val Ser Asn Leu Gly Ala Tyr Gly
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Ser Val Gly Ala Ile Val Glu Lys Pro Val Val Lys Asn Gly Gln Ile
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Val Val Gly His Thr Met Lys Leu Cys Leu Ala Cys Asp His Arg Thr
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ttt gca gca tgt agc gat ttt gat tac aat gta gaa aac cca aac ctc        96
Phe Ala Ala Cys Ser Asp Phe Asp Tyr Asn Val Glu Asn Pro Asn Leu
            20                  25                  30

acg aag gga gag gct gat ttc tct aaa tat gta gct tta gga aat tct       144
Thr Lys Gly Glu Ala Asp Phe Ser Lys Tyr Val Ala Leu Gly Asn Ser
        35                  40                  45

ctc act tct ggt tat tca gac gga gcc tta tat cgc tcg gca caa gag       192
Leu Thr Ser Gly Tyr Ser Asp Gly Ala Leu Tyr Arg Ser Ala Gln Glu
    50                  55                  60

aat tca tac ccc gca atc att gcc aaa caa atg aaa tat gta ggc ggt       240
Asn Ser Tyr Pro Ala Ile Ile Ala Lys Gln Met Lys Tyr Val Gly Gly
65                  70                  75                  80

ggc gag ttc tct caa cct ttg atg aaa gac aac att ggt ggt ttt tcg       288
Gly Glu Phe Ser Gln Pro Leu Met Lys Asp Asn Ile Gly Gly Phe Ser
                85                  90                  95

gat ttg ttt gaa gca agt aaa cac acc gca ttt tac gga aaa tta gaa       336
Asp Leu Phe Glu Ala Ser Lys His Thr Ala Phe Tyr Gly Lys Leu Glu
            100                 105                 110

tta aaa atc gta gac ggt gca cct acg cca gtg cct tct gtg cct aag       384
Leu Lys Ile Val Asp Gly Ala Pro Thr Pro Val Pro Ser Val Pro Lys
        115                 120                 125

ttt agt tta gct caa acc ttc gta aaa ggg aat ttt aat aat ttg ggc       432
Phe Ser Leu Ala Gln Thr Phe Val Lys Gly Asn Phe Asn Asn Leu Gly
    130                 135                 140

gtg cca ggg gct aaa tct tat cat tta tta gct caa ggt tac gga aat       480
Val Pro Gly Ala Lys Ser Tyr His Leu Leu Ala Gln Gly Tyr Gly Asn
145                 150                 155                 160

att gct aat ctg aag gag agt aaa gcc aat cca tat ttt gtg cga ttt       528
Ile Ala Asn Leu Lys Glu Ser Lys Ala Asn Pro Tyr Phe Val Arg Phe
                165                 170                 175

gct agc caa cca aat gcc agc gtg ctg agc gat gct ttg gca caa aaa       576
Ala Ser Gln Pro Asn Ala Ser Val Leu Ser Asp Ala Leu Ala Gln Lys
            180                 185                 190

cct aca ttc ttt acc tta tgg atc ggg aac aac gat gtt tta ggc tat       624
Pro Thr Phe Phe Thr Leu Trp Ile Gly Asn Asn Asp Val Leu Gly Tyr
        195                 200                 205

gcc atg aat ggc gca gca agc aca gat cga aaa ggg aac cct gat gta       672
Ala Met Asn Gly Ala Ala Ser Thr Asp Arg Lys Gly Asn Pro Asp Val
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225                 230                 235                 240

tct att caa aaa tta gta aaa gca ctt aca gat tca ggc gca aaa ggt      768
Ser Ile Gln Lys Leu Val Lys Ala Leu Thr Asp Ser Gly Ala Lys Gly
                245                 250                 255

gct gta gcg aat ttg cct tat gtc gaa gac att ccg tat ttt aca acc      816
Ala Val Ala Asn Leu Pro Tyr Val Glu Asp Ile Pro Tyr Phe Thr Thr
            260                 265                 270

gtg ccg gct gag cct tta agc cct tta aac aaa agt tac gct aca caa      864
Val Pro Ala Glu Pro Leu Ser Pro Leu Asn Lys Ser Tyr Ala Thr Gln
        275                 280                 285

att gaa aat ttg aat aaa ttt tat gct agc cta aat aaa gtt ttt gat      912
Ile Glu Asn Leu Asn Lys Phe Tyr Ala Ser Leu Asn Lys Val Phe Asp
    290                 295                 300

gcc cta gga gca agc gat aga aaa atc aca ttt aat gcc gat aaa gca      960
Ala Leu Gly Ala Ser Asp Arg Lys Ile Thr Phe Asn Ala Asp Lys Ala
305                 310                 315                 320

agc ggt gct gtg att gta gat aaa agt ttg cca gat tta agt caa aaa     1008
Ser Gly Ala Val Ile Val Asp Lys Ser Leu Pro Asp Leu Ser Gln Lys
                325                 330                 335

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            340                 345                 350

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Leu Leu Ala Gln Thr Phe Gly Gln Val Arg Gln Ser Lys Ala Gly Asp
        355                 360                 365

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    370                 375                 380

aga ctt gct act ttg aca aaa tta gga tta cca aag gaa aac gcc gct     1200
Arg Leu Ala Thr Leu Thr Lys Leu Gly Leu Pro Lys Glu Asn Ala Ala
385                 390                 395                 400

caa ctt tct atg aac gga ctt act tat cca ttg caa gat gcc gat gtt     1248
Gln Leu Ser Met Asn Gly Leu Thr Tyr Pro Leu Gln Asp Ala Asp Val
                405                 410                 415

tta acc aaa aat gaa gtt tca aca att cac gaa aga gta aac gaa atc     1296
Leu Thr Lys Asn Glu Val Ser Thr Ile His Glu Arg Val Asn Glu Ile
            420                 425                 430

aat caa ggc ata caa gca gtg gca aaa caa ttc aac att gca tat gtg     1344
Asn Gln Gly Ile Gln Ala Val Ala Lys Gln Phe Asn Ile Ala Tyr Val
        435                 440                 445

gac atg aat gcc gaa atg caa aaa ctc act aaa ggc ttt aaa ttc aac     1392
Asp Met Asn Ala Glu Met Gln Lys Leu Thr Lys Gly Phe Lys Phe Asn
    450                 455                 460

ggg gta gac tac aac gca agt ttt gtg act ggt gga gct ttt tcg ctt     1440
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gat gga gtg cat tta aac agc cga gga tat gcc cat aca gct aat aca     1488
Asp Gly Val His Leu Asn Ser Arg Gly Tyr Ala His Thr Ala Asn Thr
                485                 490                 495

ttt att cgt gcc atc aat cag caa tat aag gca agc att ccg ttg gta     1536
Phe Ile Arg Ala Ile Asn Gln Gln Tyr Lys Ala Ser Ile Pro Leu Val
            500                 505                 510

gat atc aac gct ttc cca ggc aca caa tta cct taa                     1572
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        35                  40                  45

Leu Thr Ser Gly Tyr Ser Asp Gly Ala Leu Tyr Arg Ser Ala Gln Glu
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Asn Ser Tyr Pro Ala Ile Ile Ala Lys Gln Met Lys Tyr Val Gly Gly
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Gly Glu Phe Ser Gln Pro Leu Met Lys Asp Asn Ile Gly Gly Phe Ser
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Asp Leu Phe Glu Ala Ser Lys His Thr Ala Phe Tyr Gly Lys Leu Glu
            100                 105                 110

Leu Lys Ile Val Asp Gly Ala Pro Thr Pro Val Pro Ser Val Pro Lys
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Phe Ser Leu Ala Gln Thr Phe Val Lys Gly Asn Phe Asn Asn Leu Gly
    130                 135                 140

Val Pro Gly Ala Lys Ser Tyr His Leu Leu Ala Gln Gly Tyr Gly Asn
145                 150                 155                 160
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Ile Ala Asn Leu Lys Glu Ser Lys Ala Asn Pro Tyr Phe Val Arg Phe
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Ala Ser Gln Pro Asn Ala Ser Val Leu Ser Asp Ala Leu Ala Gln Lys
180 185 190

Pro Thr Phe Phe Thr Leu Trp Ile Gly Asn Asn Asp Val Leu Gly Tyr
195 200 205

Ala Met Asn Gly Ala Ala Ser Thr Asp Arg Lys Gly Asn Pro Asp Val
210 215 220

Thr Thr Tyr Asn Ser Asn Asp Leu Ser Asp Ala Asn Leu Val Ala Gly
225 230 235 240

Ser Ile Gln Lys Leu Val Lys Ala Leu Thr Asp Ser Gly Ala Lys Gly
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Ala Val Ala Asn Leu Pro Tyr Val Glu Asp Ile Pro Tyr Phe Thr Thr
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Val Pro Ala Glu Pro Leu Ser Pro Leu Asn Lys Ser Tyr Ala Thr Gln
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Ile Glu Asn Leu Asn Lys Phe Tyr Ala Ser Leu Asn Lys Val Phe Asp
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Ala Leu Gly Ala Ser Asp Arg Lys Ile Thr Phe Asn Ala Asp Lys Ala
305 310 315 320

Ser Gly Ala Val Ile Val Asp Lys Ser Leu Pro Asp Leu Ser Gln Lys
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340 345 350

Leu Leu Ala Gln Thr Phe Gly Gln Val Arg Gln Ser Lys Ala Gly Asp
355 360 365

Leu Leu Pro Leu Thr Ala Ser Arg Thr Leu Gly Lys Leu Asn Ser Glu
370 375 380

Arg Leu Ala Thr Leu Thr Lys Leu Gly Leu Pro Lys Glu Asn Ala Ala
385 390 395 400

Gln Leu Ser Met Asn Gly Leu Thr Tyr Pro Leu Gln Asp Ala Asp Val
405 410 415

Leu Thr Lys Asn Glu Val Ser Thr Ile His Glu Arg Val Asn Glu Ile
420 425 430

Asn Gln Gly Ile Gln Ala Val Ala Lys Gln Phe Asn Ile Ala Tyr Val
435 440 445

Asp Met Asn Ala Glu Met Gln Lys Leu Thr Lys Gly Phe Lys Phe Asn
450 455 460

Gly Val Asp Tyr Asn Ala Ser Phe Val Thr Gly Gly Ala Phe Ser Leu
465 470 475 480

Asp Gly Val His Leu Asn Ser Arg Gly Tyr Ala His Thr Ala Asn Thr
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ttg aat gct tgt acc gaa gat ttt gaa ccc aca ttt tca gaa aac gca 96
Leu Asn Ala Cys Thr Glu Asp Phe Glu Pro Thr Phe Ser Glu Asn Ala
20 25 30

act cag cgt tat ata aat gtt cag aac gaa att aca gaa ttt ctt agt 144
Thr Gln Arg Tyr Ile Asn Val Gln Asn Glu Ile Thr Glu Phe Leu Ser
35 40 45

acc cct gat gct gat ttt att tta caa tac ttc cca gat gat aat cag 192
Thr Pro Asp Ala Asp Phe Ile Leu Gln Tyr Phe Pro Asp Asp Asn Gln
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            100                 105                 110

gag gag cta cat gaa ttt gca act cct agt cca tca gaa tat cgt gca      384
Glu Glu Leu His Glu Phe Ala Thr Pro Ser Pro Ser Glu Tyr Arg Ala
        115                 120                 125

aaa cga gga gat ttt gaa ttt ttg atc ctt aaa aaa agt aat gac aca      432
Lys Arg Gly Asp Phe Glu Phe Leu Ile Leu Lys Lys Ser Asn Asp Thr
    130                 135                 140

ctt tat cta aaa gga aag aaa aca gga aat tac atg aag cta tat aaa      480
Leu Tyr Leu Lys Gly Lys Lys Thr Gly Asn Tyr Met Lys Leu Tyr Lys
145                 150                 155                 160

gca ggg aat att caa gag att aaa agt aac att aga aaa gta gca act      528
Ala Gly Asn Ile Gln Glu Ile Lys Ser Asn Ile Arg Lys Val Ala Thr
                165                 170                 175

aca att gat agg gta gat ctt cca gct caa ggt act ata ggt aca gag      576
Thr Ile Asp Arg Val Asp Leu Pro Ala Gln Gly Thr Ile Gly Thr Glu
            180                 185                 190

cct ttg gta ttg tca aca gga gga act aga aat att att ttt agt act      624
Pro Leu Val Leu Ser Thr Gly Gly Thr Arg Asn Ile Ile Phe Ser Thr
        195                 200                 205

tta aat ggg ggg agt ata gag tct aca gaa gca tcg tat att ttt aca      672
Leu Asn Gly Gly Ser Ile Glu Ser Thr Glu Ala Ser Tyr Ile Phe Thr
    210                 215                 220

gaa aac gga att aag ttt tac aaa cca gtt gaa att aag ggg aaa gtt      720
Glu Asn Gly Ile Lys Phe Tyr Lys Pro Val Glu Ile Lys Gly Lys Val
225                 230                 235                 240

tac ggt gga tta att ttt gac gaa agt act caa aca tta aag tca gaa      768
Tyr Gly Gly Leu Ile Phe Asp Glu Ser Thr Gln Thr Leu Lys Ser Glu
                245                 250                 255

gat ggt gta att gta att aat ttg aaa ttt gtt cct atc aac ttt aaa      816
Asp Gly Val Ile Val Ile Asn Leu Lys Phe Val Pro Ile Asn Phe Lys
            260                 265                 270

tca aaa gct tgg ttt ttg gat atg agc aaa tca gag aat aca tcg gaa      864
Ser Lys Ala Trp Phe Leu Asp Met Ser Lys Ser Glu Asn Thr Ser Glu
        275                 280                 285

ggt tat aag aaa gcc aga gca ggc gat agt ctt ttg cat ggt atg att      912
Gly Tyr Lys Lys Ala Arg Ala Gly Asp Ser Leu Leu His Gly Met Ile
    290                 295                 300

cta agt aaa ttt aag tta caa gat ttc tat gtg tta ggt aat ttt aga      960
Leu Ser Lys Phe Lys Leu Gln Asp Phe Tyr Val Leu Gly Asn Phe Arg
305                 310                 315                 320

gat aat gta gga ttc aat act ttt gtt gag ggc tat aac gga gca ttt     1008
Asp Asn Val Gly Phe Asn Thr Phe Val Glu Gly Tyr Asn Gly Ala Phe
                325                 330                 335

gca att tat ggt tta agt ttc aaa gga gaa gat tca aat cca aat ctt     1056
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                340                 345                 350

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        355                 360                 365

tat gtg aat gga gtt tta gat aaa atc act aaa aat tca cct tat att     1152
Tyr Val Asn Gly Val Leu Asp Lys Ile Thr Lys Asn Ser Pro Tyr Ile
    370                 375                 380

gta gag gag gtt cag tca gat cct aaa cgt gtg aag cta ata agt aaa     1200
Val Glu Glu Val Gln Ser Asp Pro Lys Arg Val Lys Leu Ile Ser Lys
385                 390                 395                 400

aat gat caa gaa tta tgg ttt att ctt gat ttg ctt aaa tga             1242
Asn Asp Gln Glu Leu Trp Phe Ile Leu Asp Leu Leu Lys
                405                 410
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<210> 6
<211> 413
<212> PRT
<213> Ornithobacterium rhinotracheale

<400> 6

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Met Lys Lys Leu Ser Tyr Leu Leu Phe Ser Ile Pro Leu Leu Trp Gly
1               5                   10                  15

Leu Asn Ala Cys Thr Glu Asp Phe Glu Pro Thr Phe Ser Glu Asn Ala
            20                  25                  30

Thr Gln Arg Tyr Ile Asn Val Gln Asn Glu Ile Thr Glu Phe Leu Ser
        35                  40                  45

Thr Pro Asp Ala Asp Phe Ile Leu Gln Tyr Phe Pro Asp Asp Asn Gln
    50                  55                  60

Ser Tyr Gly Gly Tyr Asn Tyr Phe Leu Lys Phe Ser Gly Lys Asp Lys
65                  70                  75                  80

Val Ser Ala Glu Ser Glu Thr Asn Glu Gln Ala Val Ser Ser Thr Phe
                85                  90                  95

Arg Ile Leu Gln Asn Gly Gly Ala Val Leu Thr Phe Asp Leu Tyr Asn
            100                 105                 110

Glu Glu Leu His Glu Phe Ala Thr Pro Ser Pro Ser Glu Tyr Arg Ala
        115                 120                 125

Lys Arg Gly Asp Phe Glu Phe Leu Ile Leu Lys Lys Ser Asn Asp Thr
    130                 135                 140

Leu Tyr Leu Lys Gly Lys Lys Thr Gly Asn Tyr Met Lys Leu Tyr Lys
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145 150 155 160

Ala Gly Asn Ile Gln Glu Ile Lys Ser Asn Ile Arg Lys Val Ala Thr
165 170 175

Thr Ile Asp Arg Val Asp Leu Pro Ala Gln Gly Thr Ile Gly Thr Glu
180 185 190

Pro Leu Val Leu Ser Thr Gly Gly Thr Arg Asn Ile Ile Phe Ser Thr
195 200 205

Leu Asn Gly Gly Ser Ile Glu Ser Thr Glu Ala Ser Tyr Ile Phe Thr
210 215 220

Glu Asn Gly Ile Lys Phe Tyr Lys Pro Val Glu Ile Lys Gly Lys Val
225 230 235 240

Tyr Gly Gly Leu Ile Phe Asp Glu Ser Thr Gln Thr Leu Lys Ser Glu
245 250 255

Asp Gly Val Ile Val Ile Asn Leu Lys Phe Val Pro Ile Asn Phe Lys
260 265 270

Ser Lys Ala Trp Phe Leu Asp Met Ser Lys Ser Glu Asn Thr Ser Glu
275 280 285

Gly Tyr Lys Lys Ala Arg Ala Gly Asp Ser Leu Leu His Gly Met Ile
290 295 300

Leu Ser Lys Phe Lys Leu Gln Asp Phe Tyr Val Leu Gly Asn Phe Arg
305 310 315 320

Asp Asn Val Gly Phe Asn Thr Phe Val Glu Gly Tyr Asn Gly Ala Phe
325 330 335

Ala Ile Tyr Gly Leu Ser Phe Lys Gly Glu Asp Ser Asn Pro Asn Leu
340 345 350

Ile His Ile Glu Lys Thr Lys Pro Val Glu Phe Asp Ala Tyr Phe Lys
355 360 365

Tyr Val Asn Gly Val Leu Asp Lys Ile Thr Lys Asn Ser Pro Tyr Ile
370 375 380

Val Glu Glu Val Gln Ser Asp Pro Lys Arg Val Lys Leu Ile Ser Lys
385 390 395 400

Asn Asp Gln Glu Leu Trp Phe Ile Leu Asp Leu Leu Lys
405 410

<210> 7
<211> 1023
<212> DNA
<213> Ornithobacterium rhinotracheale

<220>
<221> CDS
<222> (1)..(1023)

<400> 7

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atg aaa gat ata ttt gaa tat aca ctt cta gca tta ggt ggt ttg cta       48
Met Lys Asp Ile Phe Glu Tyr Thr Leu Leu Ala Leu Gly Gly Leu Leu
1               5                  10                  15

ctc acc aat tgc tat gat agc gat gag att gaa gta att aaa ttt gat       96
Leu Thr Asn Cys Tyr Asp Ser Asp Glu Ile Glu Val Ile Lys Phe Asp
            20                  25                  30

gat tct ttt act cca gct ccg ccc acc gaa aaa aaa aga gac act ccg      144
Asp Ser Phe Thr Pro Ala Pro Pro Thr Glu Lys Lys Arg Asp Thr Pro
        35                  40                  45

cta ata aat tta tta gat gat ttt gta ttc ttt aaa aaa gat gta gta      192
Leu Ile Asn Leu Leu Asp Asp Phe Val Phe Phe Lys Lys Asp Val Val
    50                  55                  60

aca att ccg gta gat aaa gac aat tta gcc acc aat aat gtc atc agt      240
Thr Ile Pro Val Asp Lys Asp Asn Leu Ala Thr Asn Asn Val Ile Ser
65                  70                  75                  80

ggt gaa gtc ttt aca aat aga aaa atg tct gaa aat ttt gag tat cag      288
Gly Glu Val Phe Thr Asn Arg Lys Met Ser Glu Asn Phe Glu Tyr Gln
                85                  90                  95

ctt gaa tta gac caa gat tgg att agt agc aat ccg gac tta caa gcc      336
Leu Glu Leu Asp Gln Asp Trp Ile Ser Ser Asn Pro Asp Leu Gln Ala
            100                 105                 110

att cca aac gga gct ttt aca atc tct gga caa aca ctc aac aaa gat      384
Ile Pro Asn Gly Ala Phe Thr Ile Ser Gly Gln Thr Leu Asn Lys Asp
        115                 120                 125

gaa aga aat ggt act ttc aaa att cag ctt aat gca gag gtg gcg aaa      432
Glu Arg Asn Gly Thr Phe Lys Ile Gln Leu Asn Ala Glu Val Ala Lys
    130                 135                 140

gag cta gga ggc acc tac tat ctc ccg cta aaa ttg gtt tct aaa aat      480
Glu Leu Gly Gly Thr Tyr Tyr Leu Pro Leu Lys Leu Val Ser Lys Asn
145                 150                 155                 160

gat aat tta aac att tta aag gga tat gaa agt ggc gtt ttt aag cta      528
Asp Asn Leu Asn Ile Leu Lys Gly Tyr Glu Ser Gly Val Phe Lys Leu
                165                 170                 175

gta ttc aaa aaa tcg tat cca atc cca gaa ggt aac aat gtt gaa gga      576
Val Phe Lys Lys Ser Tyr Pro Ile Pro Glu Gly Asn Asn Val Glu Gly
            180                 185                 190
```

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aaa aaa gga tat tat ttt gat ggt tta ggc aat aat ata cct aga aca      624
Lys Lys Gly Tyr Tyr Phe Asp Gly Leu Gly Asn Asn Ile Pro Arg Thr
        195                 200                 205

gat tta tcg ttt aat tca aat tac gcc ccc gat cat ctt ttt aaa tta      672
Asp Leu Ser Phe Asn Ser Asn Tyr Ala Pro Asp His Leu Phe Lys Leu
    210                 215                 220

aat gat gga aac caa caa ggg gct aat tgg tgg gca gac act gat gat      720
Asn Asp Gly Asn Gln Gln Gly Ala Asn Trp Trp Ala Asp Thr Asp Asp
225                 230                 235                 240

aac aca aca tat ctt gat gta aaa ttc cct att aat aca ata aaa gct      768
Asn Thr Thr Tyr Leu Asp Val Lys Phe Pro Ile Asn Thr Ile Lys Ala
                245                 250                 255

ata aaa tta tac act aaa agc tat tgg caa aat gct gta ggc agt gta      816
Ile Lys Leu Tyr Thr Lys Ser Tyr Trp Gln Asn Ala Val Gly Ser Val
            260                 265                 270

aaa att gaa gtt tct aat gat aat ggc aat act tgg aaa gaa cag gga      864
Lys Ile Glu Val Ser Asn Asp Asn Gly Asn Thr Trp Lys Glu Gln Gly
        275                 280                 285

att gct aac ttt ggg caa tat tca aca gtg tct act att gta ttc act      912
Ile Ala Asn Phe Gly Gln Tyr Ser Thr Val Ser Thr Ile Val Phe Thr
    290                 295                 300

caa cca att gac att aat gct gtc aga ata tct aac ttc act aga ggg      960
Gln Pro Ile Asp Ile Asn Ala Val Arg Ile Ser Asn Phe Thr Arg Gly
305                 310                 315                 320

gga agt agt aat ttc att aac att aac gag gtg gaa gta ttc aaa ata     1008
Gly Ser Ser Asn Phe Ile Asn Ile Asn Glu Val Glu Val Phe Lys Ile
                325                 330                 335

cca agt gaa gaa taa                                                1023
Pro Ser Glu Glu
            340
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<210> 8
<211> 340
<212> PRT
<213> Ornithobacterium rhinotracheale

<400> 8

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Met Lys Asp Ile Phe Glu Tyr Thr Leu Leu Ala Leu Gly Gly Leu Leu
1               5                   10                  15

Leu Thr Asn Cys Tyr Asp Ser Asp Glu Ile Glu Val Ile Lys Phe Asp
            20                  25                  30

Asp Ser Phe Thr Pro Ala Pro Pro Thr Glu Lys Lys Arg Asp Thr Pro
        35                  40                  45

Leu Ile Asn Leu Leu Asp Asp Phe Val Phe Phe Lys Lys Asp Val Val
    50                  55                  60
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Thr Ile Pro Val Asp Lys Asp Asn Leu Ala Thr Asn Asn Val Ile Ser
65 70 75 80

Gly Glu Val Phe Thr Asn Arg Lys Met Ser Glu Asn Phe Glu Tyr Gln
85 90 95

Leu Glu Leu Asp Gln Asp Trp Ile Ser Ser Asn Pro Asp Leu Gln Ala
100 105 110

Ile Pro Asn Gly Ala Phe Thr Ile Ser Gly Gln Thr Leu Asn Lys Asp
115 120 125

Glu Arg Asn Gly Thr Phe Lys Ile Gln Leu Asn Ala Glu Val Ala Lys
130 135 140

Glu Leu Gly Gly Thr Tyr Tyr Leu Pro Leu Lys Leu Val Ser Lys Asn
145 150 155 160

Asp Asn Leu Asn Ile Leu Lys Gly Tyr Glu Ser Gly Val Phe Lys Leu
165 170 175

Val Phe Lys Lys Ser Tyr Pro Ile Pro Glu Gly Asn Asn Val Glu Gly
180 185 190

Lys Lys Gly Tyr Tyr Phe Asp Gly Leu Gly Asn Asn Ile Pro Arg Thr
195 200 205

Asp Leu Ser Phe Asn Ser Asn Tyr Ala Pro Asp His Leu Phe Lys Leu
210 215 220

Asn Asp Gly Asn Gln Gln Gly Ala Asn Trp Trp Ala Asp Thr Asp Asp
225 230 235 240

Asn Thr Thr Tyr Leu Asp Val Lys Phe Pro Ile Asn Thr Ile Lys Ala
245 250 255

Ile Lys Leu Tyr Thr Lys Ser Tyr Trp Gln Asn Ala Val Gly Ser Val
260 265 270

Lys Ile Glu Val Ser Asn Asp Asn Gly Asn Thr Trp Lys Glu Gln Gly
275 280 285

Ile Ala Asn Phe Gly Gln Tyr Ser Thr Val Ser Thr Ile Val Phe Thr
290 295 300

Gln Pro Ile Asp Ile Asn Ala Val Arg Ile Ser Asn Phe Thr Arg Gly
305 310 315 320

Gly Ser Ser Asn Phe Ile Asn Ile Asn Glu Val Glu Val Phe Lys Ile
325 330 335

Pro Ser Glu Glu
340

<210> 9
<211> 1230
<212> DNA
<213> Ornithobacterium rhinotracheale

<220>
<221> CDS
<222> (1)..(1230)

<400> 9
atg att aaa aaa gta ttt tta tcg ttt gtg ctc atg gca agc aca ggc 48
Met Ile Lys Lys Val Phe Leu Ser Phe Val Leu Met Ala Ser Thr Gly
1 5 10 15

att tta tgg gca ggc gga tac cga gtt tcg ctg caa ggt gta aga caa 96
Ile Leu Trp Ala Gly Gly Tyr Arg Val Ser Leu Gln Gly Val Arg Gln
20 25 30

gcc gcc atg ggg gca caa ggt gta gca ctt tct cac gat gcg agt gtg 144
Ala Ala Met Gly Ala Gln Gly Val Ala Leu Ser His Asp Ala Ser Val
35 40 45

gca ttt ttc aac ccc gca gca ttg gct ttt gta gat gat aaa tta agt 192
Ala Phe Phe Asn Pro Ala Ala Leu Ala Phe Val Asp Asp Lys Leu Ser
50 55 60

att gct gtg gga ggt ttc gga att ggg att acc gca aaa tac caa aac 240
Ile Ala Val Gly Gly Phe Gly Ile Gly Ile Thr Ala Lys Tyr Gln Asn
65 70 75 80

cgc gaa acg ctc tat aaa gcc gaa acc gac aat ccg ctg ggg aca cca 288
Arg Glu Thr Leu Tyr Lys Ala Glu Thr Asp Asn Pro Leu Gly Thr Pro
85 90 95

ctt tat ctt gct aca agc tat aag cct acg gaa aaa cta gcc tta ggc 336
Leu Tyr Leu Ala Thr Ser Tyr Lys Pro Thr Glu Lys Leu Ala Leu Gly
100 105 110

gtg agc gta acc act ccg ttt ggg agc acc gta gac tgg gga gat aaa 384
Val Ser Val Thr Thr Pro Phe Gly Ser Thr Val Asp Trp Gly Asp Lys
115 120 125

tgg gct gga cgc tac atc att gat aga att gcc ctc aaa tcg ttt ttt 432
Trp Ala Gly Arg Tyr Ile Ile Asp Arg Ile Ala Leu Lys Ser Phe Phe
130 135 140

att cag ccc acg gca gcg tat aaa gta acc gat tgg ctc tct gtg ggg 480
Ile Gln Pro Thr Ala Ala Tyr Lys Val Thr Asp Trp Leu Ser Val Gly
145 150 155 160

gct ggt gcc atc atc gct cga ggc aat gta aac att aag cgt gca ata 528
Ala Gly Ala Ile Ile Ala Arg Gly Asn Val Asn Ile Lys Arg Ala Ile

```
                    165                 170                 175

tct cta ggc aac caa gat gcg ggg cta gaa atc gac aaa aaa gga gct      576
Ser Leu Gly Asn Gln Asp Ala Gly Leu Glu Ile Asp Lys Lys Gly Ala
                180                 185                 190

cac gga aca ggg ttt aat gta ggg gtt tat gcc aaa cca aat gat aaa      624
His Gly Thr Gly Phe Asn Val Gly Val Tyr Ala Lys Pro Asn Asp Lys
        195                 200                 205

tta aat ata gga att gct tac cga tca gaa gtg aag atg aaa gcg gac      672
Leu Asn Ile Gly Ile Ala Tyr Arg Ser Glu Val Lys Met Lys Ala Asp
    210                 215                 220

aaa ggt gat gct gtt ttc aaa aat tta cca agt atc gta aag ggc aaa      720
Lys Gly Asp Ala Val Phe Lys Asn Leu Pro Ser Ile Val Lys Gly Lys
225                 230                 235                 240

atg cct ttt tcg gct aaa tat ttt gat gct caa tta cct cta cca gca      768
Met Pro Phe Ser Ala Lys Tyr Phe Asp Ala Gln Leu Pro Leu Pro Ala
                245                 250                 255

gaa ctt tta att ggg gcg aac tat aaa gta aca cca aaa ttg ctc gta      816
Glu Leu Leu Ile Gly Ala Asn Tyr Lys Val Thr Pro Lys Leu Leu Val
            260                 265                 270

ggg gca gaa att ggg gct gta aaa tgg aac gcc tac gaa aca tta aat      864
Gly Ala Glu Ile Gly Ala Val Lys Trp Asn Ala Tyr Glu Thr Leu Asn
        275                 280                 285

att aaa ctt tat aac aac gaa gag gaa tac aac aat act tct aac aaa      912
Ile Lys Leu Tyr Asn Asn Glu Glu Glu Tyr Asn Asn Thr Ser Asn Lys
    290                 295                 300

aat tac aaa aac aca tta aat tat agt atc ggg gct gaa tat tta atc      960
Asn Tyr Lys Asn Thr Leu Asn Tyr Ser Ile Gly Ala Glu Tyr Leu Ile
305                 310                 315                 320

aat cca aaa gct gcc tta cgc tta ggg tat aaa ttc gac aaa tcg cct     1008
Asn Pro Lys Ala Ala Leu Arg Leu Gly Tyr Lys Phe Asp Lys Ser Pro
                325                 330                 335

tcg cca gct gat tcg ttt aac cca gag acc cca acc att aat tat cac     1056
Ser Pro Ala Asp Ser Phe Asn Pro Glu Thr Pro Thr Ile Asn Tyr His
            340                 345                 350

gca ttt aca act gga ttt gga tat gaa ttc gag aga ttt cgt gta gat     1104
Ala Phe Thr Thr Gly Phe Gly Tyr Glu Phe Glu Arg Phe Arg Val Asp
        355                 360                 365

gcc atg gcg gaa tat tta cta gga aac gaa aga agc ttc cac aat aca     1152
Ala Met Ala Glu Tyr Leu Leu Gly Asn Glu Arg Ser Phe His Asn Thr
    370                 375                 380

caa tat aac ttt ggg ggc gac atc aac act ggt ggc tat gtg ttt ggt     1200
Gln Tyr Asn Phe Gly Gly Asp Ile Asn Thr Gly Gly Tyr Val Phe Gly
385                 390                 395                 400

cta ggt tta tcg tat aga ctt gac aaa taa                            1230
Leu Gly Leu Ser Tyr Arg Leu Asp Lys
                405
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<210> 10
<211> 409
<212> PRT
<213> Ornithobacterium rhinotracheale

<400> 10

Met Ile Lys Lys Val Phe Leu Ser Phe Val Leu Met Ala Ser Thr Gly
1 5 10 15

Ile Leu Trp Ala Gly Gly Tyr Arg Val Ser Leu Gln Gly Val Arg Gln
20 25 30

Ala Ala Met Gly Ala Gln Gly Val Ala Leu Ser His Asp Ala Ser Val
35 40 45

Ala Phe Phe Asn Pro Ala Ala Leu Ala Phe Val Asp Asp Lys Leu Ser
50 55 60

Ile Ala Val Gly Gly Phe Gly Ile Gly Ile Thr Ala Lys Tyr Gln Asn
65 70 75 80

Arg Glu Thr Leu Tyr Lys Ala Glu Thr Asp Asn Pro Leu Gly Thr Pro
85 90 95

Leu Tyr Leu Ala Thr Ser Tyr Lys Pro Thr Glu Lys Leu Ala Leu Gly
100 105 110

Val Ser Val Thr Thr Pro Phe Gly Ser Thr Val Asp Trp Gly Asp Lys
115 120 125

Trp Ala Gly Arg Tyr Ile Ile Asp Arg Ile Ala Leu Lys Ser Phe Phe
130 135 140

Ile Gln Pro Thr Ala Ala Tyr Lys Val Thr Asp Trp Leu Ser Val Gly
145 150 155 160

Ala Gly Ala Ile Ile Ala Arg Gly Asn Val Asn Ile Lys Arg Ala Ile
165 170 175

Ser Leu Gly Asn Gln Asp Ala Gly Leu Glu Ile Asp Lys Lys Gly Ala
180 185 190

His Gly Thr Gly Phe Asn Val Gly Val Tyr Ala Lys Pro Asn Asp Lys
195 200 205

Leu Asn Ile Gly Ile Ala Tyr Arg Ser Glu Val Lys Met Lys Ala Asp
210 215 220

```
Lys Gly Asp Ala Val Phe Lys Asn Leu Pro Ser Ile Val Lys Gly Lys
225                 230                 235                 240

Met Pro Phe Ser Ala Lys Tyr Phe Asp Ala Gln Leu Pro Leu Pro Ala
                245                 250                 255

Glu Leu Leu Ile Gly Ala Asn Tyr Lys Val Thr Pro Lys Leu Leu Val
            260                 265                 270

Gly Ala Glu Ile Gly Ala Val Lys Trp Asn Ala Tyr Glu Thr Leu Asn
        275                 280                 285

Ile Lys Leu Tyr Asn Asn Glu Glu Glu Tyr Asn Asn Thr Ser Asn Lys
    290                 295                 300

Asn Tyr Lys Asn Thr Leu Asn Tyr Ser Ile Gly Ala Glu Tyr Leu Ile
305                 310                 315                 320

Asn Pro Lys Ala Ala Leu Arg Leu Gly Tyr Lys Phe Asp Lys Ser Pro
                325                 330                 335

Ser Pro Ala Asp Ser Phe Asn Pro Glu Thr Pro Thr Ile Asn Tyr His
            340                 345                 350

Ala Phe Thr Thr Gly Phe Gly Tyr Glu Phe Glu Arg Phe Arg Val Asp
        355                 360                 365

Ala Met Ala Glu Tyr Leu Leu Gly Asn Glu Arg Ser Phe His Asn Thr
    370                 375                 380

Gln Tyr Asn Phe Gly Gly Asp Ile Asn Thr Gly Gly Tyr Val Phe Gly
385                 390                 395                 400

Leu Gly Leu Ser Tyr Arg Leu Asp Lys
                405
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<210> 11
<211> 1140
<212> DNA
<213> Ornithobacterium rhinotracheale

<220>
<221> CDS
<222> (1)..(1140)

<400> 11

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atg aag aaa ata ctt tta gca att agc ttt tcg tct ttt gtt tta agc       48
Met Lys Lys Ile Leu Leu Ala Ile Ser Phe Ser Ser Phe Val Leu Ser
1               5                   10                  15
```

```
tgt agc agt gat gat tac act cca gcc aca cct aaa gaa aca gaa aag        96
Cys Ser Ser Asp Asp Tyr Thr Pro Ala Thr Pro Lys Glu Thr Glu Lys
            20                  25                  30

cct aag gaa gag gct gtg gtt cca aat aag cca gat gaa cca aag gct       144
Pro Lys Glu Glu Ala Val Val Pro Asn Lys Pro Asp Glu Pro Lys Ala
        35                  40                  45

gat gat gga aac gaa aat cca gaa aac act gga gat gaa gag aat gga       192
Asp Asp Gly Asn Glu Asn Pro Glu Asn Thr Gly Asp Glu Glu Asn Gly
    50                  55                  60

gat aat aca aac tcc gtt gtc ggg aag cct gat gat ttc cac atg ggg       240
Asp Asn Thr Asn Ser Val Val Gly Lys Pro Asp Asp Phe His Met Gly
65                  70                  75                  80

aat cgc tct tat gct agc tgg aaa gaa gat gtg gat tat atc gga ggt       288
Asn Arg Ser Tyr Ala Ser Trp Lys Glu Asp Val Asp Tyr Ile Gly Gly
                85                  90                  95

ttt gat att gaa act ctt tta agt ggg gct gat aat caa aaa tat gat       336
Phe Asp Ile Glu Thr Leu Leu Ser Gly Ala Asp Asn Gln Lys Tyr Asp
            100                 105                 110

gcg gct tat ttt agc caa ttt atc aag ata ttc tca tct agt cca aac       384
Ala Ala Tyr Phe Ser Gln Phe Ile Lys Ile Phe Ser Ser Ser Pro Asn
        115                 120                 125

gga aac aat ttc tac act ttt cag gca gaa gac ttt aaa gat gtc gag       432
Gly Asn Asn Phe Tyr Thr Phe Gln Ala Glu Asp Phe Lys Asp Val Glu
    130                 135                 140

att aaa gac tta aag ttt gat att ggt aga aat gta att aca ttt aaa       480
Ile Lys Asp Leu Lys Phe Asp Ile Gly Arg Asn Val Ile Thr Phe Lys
145                 150                 155                 160

act agc tac aaa ggc gta aaa agt gaa att aca tct tct tta aaa ttt       528
Thr Ser Tyr Lys Gly Val Lys Ser Glu Ile Thr Ser Ser Leu Lys Phe
                165                 170                 175

gat ttg gct aat ttt tat gat cga aaa atc aaa ata aac gaa gat ttc       576
Asp Leu Ala Asn Phe Tyr Asp Arg Lys Ile Lys Ile Asn Glu Asp Phe
            180                 185                 190

gtt gca tct cac tac atg aga ggg att tat gag gag ctt gga ggt ttt       624
Val Ala Ser His Tyr Met Arg Gly Ile Tyr Glu Glu Leu Gly Gly Phe
        195                 200                 205

atc ggg aat tta tta aac tac gac gat gag aaa tac aat cta gag tta       672
Ile Gly Asn Leu Leu Asn Tyr Asp Asp Glu Lys Tyr Asn Leu Glu Leu
    210                 215                 220

gcg ggg tca aaa aac aaa gat gaa tcc aat aac tct tta ggt ttt agc       720
Ala Gly Ser Lys Asn Lys Asp Glu Ser Asn Asn Ser Leu Gly Phe Ser
225                 230                 235                 240

att cgc gta aca gat aaa aaa gat aag tat ata aca acg gtt tat aaa       768
Ile Arg Val Thr Asp Lys Lys Asp Lys Tyr Ile Thr Thr Val Tyr Lys
                245                 250                 255

aac atc tca gga ttt agg cct ctt tct agt ctg cag gag gag ctt tcc       816
Asn Ile Ser Gly Phe Arg Pro Leu Ser Ser Leu Gln Glu Glu Leu Ser
            260                 265                 270
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att gct cct act tac gaa ttg cga gag aaa atc aag gag aaa ata gat      864
Ile Ala Pro Thr Tyr Glu Leu Arg Glu Lys Ile Lys Glu Lys Ile Asp
        275                 280                 285

aga aat aaa aga aac att agc cta ttg gag cta tta aaa cca tcg gta      912
Arg Asn Lys Arg Asn Ile Ser Leu Leu Glu Leu Leu Lys Pro Ser Val
    290                 295                 300

aac gaa tgg atg aag tct gcc gat ttc tac ttt aat aac act gat ttg      960
Asn Glu Trp Met Lys Ser Ala Asp Phe Tyr Phe Asn Asn Thr Asp Leu
305                 310                 315                 320

gaa tgg aga gga gat cat tat tca gct aga ggg ttt tta gat ttg tat     1008
Glu Trp Arg Gly Asp His Tyr Ser Ala Arg Gly Phe Leu Asp Leu Tyr
                325                 330                 335

ata ggt tcg cct aga ttt gag ctg att tta gca aca aaa gaa gac aat     1056
Ile Gly Ser Pro Arg Phe Glu Leu Ile Leu Ala Thr Lys Glu Asp Asn
            340                 345                 350

tgg ttg att ttg aaa gtg aaa gtg gtt cag ata aat gaa gtg cct acc     1104
Trp Leu Ile Leu Lys Val Lys Val Val Gln Ile Asn Glu Val Pro Thr
        355                 360                 365

gat ttg gtg tat agc tta aga gtt tca att aac taa                    1140
Asp Leu Val Tyr Ser Leu Arg Val Ser Ile Asn
    370                 375
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<210> 12
<211> 379
<212> PRT
<213> Ornithobacterium rhinotracheale

<400> 12

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Met Lys Lys Ile Leu Leu Ala Ile Ser Phe Ser Ser Phe Val Leu Ser
1               5                   10                  15

Cys Ser Ser Asp Asp Tyr Thr Pro Ala Thr Pro Lys Glu Thr Glu Lys
            20                  25                  30

Pro Lys Glu Glu Ala Val Val Pro Asn Lys Pro Asp Glu Pro Lys Ala
        35                  40                  45

Asp Asp Gly Asn Glu Asn Pro Glu Asn Thr Gly Asp Glu Glu Asn Gly
    50                  55                  60

Asp Asn Thr Asn Ser Val Val Gly Lys Pro Asp Asp Phe His Met Gly
65                  70                  75                  80

Asn Arg Ser Tyr Ala Ser Trp Lys Glu Asp Val Asp Tyr Ile Gly Gly
                85                  90                  95

Phe Asp Ile Glu Thr Leu Leu Ser Gly Ala Asp Asn Gln Lys Tyr Asp
            100                 105                 110
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Ala Ala Tyr Phe Ser Gln Phe Ile Lys Ile Phe Ser Ser Ser Pro Asn
115 120 125

Gly Asn Asn Phe Tyr Thr Phe Gln Ala Glu Asp Phe Lys Asp Val Glu
130 135 140

Ile Lys Asp Leu Lys Phe Asp Ile Gly Arg Asn Val Ile Thr Phe Lys
145 150 155 160

Thr Ser Tyr Lys Gly Val Lys Ser Glu Ile Thr Ser Ser Leu Lys Phe
165 170 175

Asp Leu Ala Asn Phe Tyr Asp Arg Lys Ile Lys Ile Asn Glu Asp Phe
180 185 190

Val Ala Ser His Tyr Met Arg Gly Ile Tyr Glu Glu Leu Gly Gly Phe
195 200 205

Ile Gly Asn Leu Leu Asn Tyr Asp Asp Glu Lys Tyr Asn Leu Glu Leu
210 215 220

Ala Gly Ser Lys Asn Lys Asp Glu Ser Asn Asn Ser Leu Gly Phe Ser
225 230 235 240

Ile Arg Val Thr Asp Lys Lys Asp Lys Tyr Ile Thr Thr Val Tyr Lys
245 250 255

Asn Ile Ser Gly Phe Arg Pro Leu Ser Ser Leu Gln Glu Glu Leu Ser
260 265 270

Ile Ala Pro Thr Tyr Glu Leu Arg Glu Lys Ile Lys Glu Lys Ile Asp
275 280 285

Arg Asn Lys Arg Asn Ile Ser Leu Leu Glu Leu Leu Lys Pro Ser Val
290 295 300

Asn Glu Trp Met Lys Ser Ala Asp Phe Tyr Phe Asn Asn Thr Asp Leu
305 310 315 320

Glu Trp Arg Gly Asp His Tyr Ser Ala Arg Gly Phe Leu Asp Leu Tyr
325 330 335

Ile Gly Ser Pro Arg Phe Glu Leu Ile Leu Ala Thr Lys Glu Asp Asn
340 345 350

Trp Leu Ile Leu Lys Val Lys Val Val Gln Ile Asn Glu Val Pro Thr

355 360 365

Asp Leu Val Tyr Ser Leu Arg Val Ser Ile Asn
370 375

<210> 13
<211> 918
<212> DNA
<213> Ornithobacterium rhinotracheale

<220>
<221> CDS
<222> (1)..(918)

<400> 13

atg att gta aaa gac ttt tca gac tat aca ttc cga tgt tct caa tta 48
Met Ile Val Lys Asp Phe Ser Asp Tyr Thr Phe Arg Cys Ser Gln Leu
1 5 10 15

ggt aag tta atg gtt ggt gtc aag cca cca tta acc cct aat caa gag 96
Gly Lys Leu Met Val Gly Val Lys Pro Pro Leu Thr Pro Asn Gln Glu
20 25 30

aag ttg ctc aca gac tta gag ggc aaa atg gaa gct ggg acc att acc 144
Lys Leu Leu Thr Asp Leu Glu Gly Lys Met Glu Ala Gly Thr Ile Thr
35 40 45

aaa aag caa atc atc act tat ggt gaa ttg ctt tcc aag aaa aac caa 192
Lys Lys Gln Ile Ile Thr Tyr Gly Glu Leu Leu Ser Lys Lys Asn Gln
50 55 60

aag ctt gaa tta tct gca agt gta aag tct tac tta gcc gac att cat 240
Lys Leu Glu Leu Ser Ala Ser Val Lys Ser Tyr Leu Ala Asp Ile His
65 70 75 80

aaa gaa gtc ttt ttt ggt cgt gat aag gaa ttg acc aat aaa tat cta 288
Lys Glu Val Phe Phe Gly Arg Asp Lys Glu Leu Thr Asn Lys Tyr Leu
85 90 95

tca aaa ggc att caa gta gaa gaa aag agc ata acg ctc tat tcc gat 336
Ser Lys Gly Ile Gln Val Glu Glu Lys Ser Ile Thr Leu Tyr Ser Asp
100 105 110

gtc tgt aac aag tta ttc cta aag aat aaa aag ttt tac aaa aac gat 384
Val Cys Asn Lys Leu Phe Leu Lys Asn Lys Lys Phe Tyr Lys Asn Asp
115 120 125

ttt att caa ggt acg cca gat aac acg caa gac aaa atc aga gat atc 432
Phe Ile Gln Gly Thr Pro Asp Asn Thr Gln Asp Lys Ile Arg Asp Ile
130 135 140

aaa agt agt tgg gac ttc tca acc ttt cct cta cac gcc gat gaa acg 480
Lys Ser Ser Trp Asp Phe Ser Thr Phe Pro Leu His Ala Asp Glu Thr
145 150 155 160

cca acc aaa gac tat gaa tgg cag ttg caa ggt tat atg gaa tta aca 528
Pro Thr Lys Asp Tyr Glu Trp Gln Leu Gln Gly Tyr Met Glu Leu Thr
165 170 175

ggc tta aaa gaa gct gag ttg att tat tgc ttg gtt gat acg cct cat 576

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Gly Leu Lys Glu Ala Glu Leu Ile Tyr Cys Leu Val Asp Thr Pro His
            180                 185                 190

aaa att gta gaa gat gaa atc cga aga atg gac tgg aag cat aat tta      624
Lys Ile Val Glu Asp Glu Ile Arg Arg Met Asp Trp Lys His Asn Leu
        195                 200                 205

ctt gac att aac ggc gaa gtg aga gcc gag aca aga gat tta gta gtt      672
Leu Asp Ile Asn Gly Glu Val Arg Ala Glu Thr Arg Asp Leu Val Val
    210                 215                 220

gag att gtg tct aac tta att tat acc aag caa ggc ttg gaa gac ttt      720
Glu Ile Val Ser Asn Leu Ile Tyr Thr Lys Gln Gly Leu Glu Asp Phe
225                 230                 235                 240

tgt cag cag tcc gca gtc ata aac aaa gat tgg ttc acg gac ttt gag      768
Cys Gln Gln Ser Ala Val Ile Asn Lys Asp Trp Phe Thr Asp Phe Glu
                245                 250                 255

gaa ata cca caa gaa ttg aga att aaa gtt ttt cac ttt gag cat caa      816
Glu Ile Pro Gln Glu Leu Arg Ile Lys Val Phe His Phe Glu His Gln
            260                 265                 270

aaa gag atg att agc gca ctc tac gag caa ata gga aga tgt aga gcg      864
Lys Glu Met Ile Ser Ala Leu Tyr Glu Gln Ile Gly Arg Cys Arg Ala
        275                 280                 285

cat tta aac gac ttg acc atg aaa atg gca aca cga tta gaa tta ata      912
His Leu Asn Asp Leu Thr Met Lys Met Ala Thr Arg Leu Glu Leu Ile
    290                 295                 300

gca taa                                                             918
Ala
305
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<210> 14
<211> 305
<212> PRT
<213> Ornithobacterium rhinotracheale

<400> 14

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Met Ile Val Lys Asp Phe Ser Asp Tyr Thr Phe Arg Cys Ser Gln Leu
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Gly Lys Leu Met Val Gly Val Lys Pro Pro Leu Thr Pro Asn Gln Glu
            20                  25                  30

Lys Leu Leu Thr Asp Leu Glu Gly Lys Met Glu Ala Gly Thr Ile Thr
        35                  40                  45

Lys Lys Gln Ile Ile Thr Tyr Gly Glu Leu Leu Ser Lys Lys Asn Gln
    50                  55                  60

Lys Leu Glu Leu Ser Ala Ser Val Lys Ser Tyr Leu Ala Asp Ile His
65                  70                  75                  80
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Lys Glu Val Phe Phe Gly Arg Asp Lys Glu Leu Thr Asn Lys Tyr Leu
85 90 95

Ser Lys Gly Ile Gln Val Glu Glu Lys Ser Ile Thr Leu Tyr Ser Asp
100 105 110

Val Cys Asn Lys Leu Phe Leu Lys Asn Lys Lys Phe Tyr Lys Asn Asp
115 120 125

Phe Ile Gln Gly Thr Pro Asp Asn Thr Gln Asp Lys Ile Arg Asp Ile
130 135 140

Lys Ser Ser Trp Asp Phe Ser Thr Phe Pro Leu His Ala Asp Glu Thr
145 150 155 160

Pro Thr Lys Asp Tyr Glu Trp Gln Leu Gln Gly Tyr Met Glu Leu Thr
165 170 175

Gly Leu Lys Glu Ala Glu Leu Ile Tyr Cys Leu Val Asp Thr Pro His
180 185 190

Lys Ile Val Glu Asp Glu Ile Arg Arg Met Asp Trp Lys His Asn Leu
195 200 205

Leu Asp Ile Asn Gly Glu Val Arg Ala Glu Thr Arg Asp Leu Val Val
210 215 220

Glu Ile Val Ser Asn Leu Ile Tyr Thr Lys Gln Gly Leu Glu Asp Phe
225 230 235 240

Cys Gln Gln Ser Ala Val Ile Asn Lys Asp Trp Phe Thr Asp Phe Glu
245 250 255

Glu Ile Pro Gln Glu Leu Arg Ile Lys Val Phe His Phe Glu His Gln
260 265 270

Lys Glu Met Ile Ser Ala Leu Tyr Glu Gln Ile Gly Arg Cys Arg Ala
275 280 285

His Leu Asn Asp Leu Thr Met Lys Met Ala Thr Arg Leu Glu Leu Ile
290 295 300

Ala
305

<210> 15
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Met Asn Glu Leu Ala Lys Asn Asp Ile Lys Ser Leu Leu Lys Ser Ala
1               5                  10                  15

gac atc aac aaa aga ttt gag caa ttg ctc ggc aaa aaa gca caa ggc        96
Asp Ile Asn Lys Arg Phe Glu Gln Leu Leu Gly Lys Lys Ala Gln Gly
            20                  25                  30

ttt atc tca tca gtc ttg cag acg gca caa aat aac aga ttg tta gcg       144
Phe Ile Ser Ser Val Leu Gln Thr Ala Gln Asn Asn Arg Leu Leu Ala
        35                  40                  45

aca gcc gac cca aag acc att cta aac gct gca gta aca gcc gcg act       192
Thr Ala Asp Pro Lys Thr Ile Leu Asn Ala Ala Val Thr Ala Ala Thr
    50                  55                  60

tta gat ttg cca att aat cag aat tta ggt tac gcc tac atc gtg cct       240
Leu Asp Leu Pro Ile Asn Gln Asn Leu Gly Tyr Ala Tyr Ile Val Pro
65                  70                  75                  80

tac aaa ggg cag gcg caa ttc caa tta ggc tgg aag ggc ttt gta gca       288
Tyr Lys Gly Gln Ala Gln Phe Gln Leu Gly Trp Lys Gly Phe Val Ala
                85                  90                  95

tta gct aaa aga agt ggc gca tat ttg aaa atg aat gta gta act gtc       336
Leu Ala Lys Arg Ser Gly Ala Tyr Leu Lys Met Asn Val Val Thr Val
            100                 105                 110

tat caa aat caa ttc aaa tcc tac aat cgc tta aca gaa gaa tta gat       384
Tyr Gln Asn Gln Phe Lys Ser Tyr Asn Arg Leu Thr Glu Glu Leu Asp
        115                 120                 125

gcc gat ttc aca atc gaa ggc aat ggt gaa gta gtt ggt tat gca gcc       432
Ala Asp Phe Thr Ile Glu Gly Asn Gly Glu Val Val Gly Tyr Ala Ala
    130                 135                 140

tat ttc aaa gaa atc aat ggt ttt gaa aag ctt tcg ttt tgg tca att       480
Tyr Phe Lys Glu Ile Asn Gly Phe Glu Lys Leu Ser Phe Trp Ser Ile
145                 150                 155                 160

gag caa gta aaa aaa cac gcc acc aaa tac tct caa act tat ggt aaa       528
Glu Gln Val Lys Lys His Ala Thr Lys Tyr Ser Gln Thr Tyr Gly Lys
                165                 170                 175

aaa tca cgc tcg ggg gca tta atg ttt tcg cct tgg aat gat gaa gac       576
Lys Ser Arg Ser Gly Ala Leu Met Phe Ser Pro Trp Asn Asp Glu Asp
            180                 185                 190

cag ttt gac gca atg gct atg aag act gtc tta aaa aac acg ctc tca       624
Gln Phe Asp Ala Met Ala Met Lys Thr Val Leu Lys Asn Thr Leu Ser
        195                 200                 205

aag ttt ggg aca ctc tca att gaa atg caa atg gcg caa atg gca gac       672
Lys Phe Gly Thr Leu Ser Ile Glu Met Gln Met Ala Gln Met Ala Asp
    210                 215                 220
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caa gca gtc atc aag aac gag ggg gag tac gag tat ata gac aat acc      720
Gln Ala Val Ile Lys Asn Glu Gly Glu Tyr Glu Tyr Ile Asp Asn Thr
225                 230                 235                 240

ata gac att gaa gct gaa agt gcc gaa gaa gaa gcc aat cgt att atg      768
Ile Asp Ile Glu Ala Glu Ser Ala Glu Glu Glu Ala Asn Arg Ile Met
                245                 250                 255

aaa ttt att gat aaa gcc gaa agc att gaa gcc tta gag gaa tta aaa      816
Lys Phe Ile Asp Lys Ala Glu Ser Ile Glu Ala Leu Glu Glu Leu Lys
            260                 265                 270

tca tca gtt gat gag aat ggc gat tta gag tta tta gcc tat tac gac      864
Ser Ser Val Asp Glu Asn Gly Asp Leu Glu Leu Leu Ala Tyr Tyr Asp
        275                 280                 285

aac aga aaa aat gaa tta aaa tga                                      888
Asn Arg Lys Asn Glu Leu Lys
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<210> 16
<211> 295
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<213> Ornithobacterium rhinotracheale

<400> 16

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Met Asn Glu Leu Ala Lys Asn Asp Ile Lys Ser Leu Leu Lys Ser Ala
1               5                   10                  15

Asp Ile Asn Lys Arg Phe Glu Gln Leu Leu Gly Lys Lys Ala Gln Gly
            20                  25                  30

Phe Ile Ser Ser Val Leu Gln Thr Ala Gln Asn Asn Arg Leu Leu Ala
        35                  40                  45

Thr Ala Asp Pro Lys Thr Ile Leu Asn Ala Ala Val Thr Ala Ala Thr
    50                  55                  60

Leu Asp Leu Pro Ile Asn Gln Asn Leu Gly Tyr Ala Tyr Ile Val Pro
65                  70                  75                  80

Tyr Lys Gly Gln Ala Gln Phe Gln Leu Gly Trp Lys Gly Phe Val Ala
                85                  90                  95

Leu Ala Lys Arg Ser Gly Ala Tyr Leu Lys Met Asn Val Val Thr Val
            100                 105                 110

Tyr Gln Asn Gln Phe Lys Ser Tyr Asn Arg Leu Thr Glu Glu Leu Asp
        115                 120                 125

Ala Asp Phe Thr Ile Glu Gly Asn Gly Glu Val Val Gly Tyr Ala Ala
    130                 135                 140
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Tyr Phe Lys Glu Ile Asn Gly Phe Glu Lys Leu Ser Phe Trp Ser Ile
145                 150                 155                 160

Glu Gln Val Lys Lys His Ala Thr Lys Tyr Ser Gln Thr Tyr Gly Lys
                165                 170                 175

Lys Ser Arg Ser Gly Ala Leu Met Phe Ser Pro Trp Asn Asp Glu Asp
            180                 185                 190

Gln Phe Asp Ala Met Ala Met Lys Thr Val Leu Lys Asn Thr Leu Ser
        195                 200                 205

Lys Phe Gly Thr Leu Ser Ile Glu Met Gln Met Ala Gln Met Ala Asp
    210                 215                 220

Gln Ala Val Ile Lys Asn Glu Gly Glu Tyr Glu Tyr Ile Asp Asn Thr
225                 230                 235                 240

Ile Asp Ile Glu Ala Glu Ser Ala Glu Glu Glu Ala Asn Arg Ile Met
                245                 250                 255

Lys Phe Ile Asp Lys Ala Glu Ser Ile Glu Ala Leu Glu Glu Leu Lys
            260                 265                 270

Ser Ser Val Asp Glu Asn Gly Asp Leu Glu Leu Leu Ala Tyr Tyr Asp
        275                 280                 285

Asn Arg Lys Asn Glu Leu Lys
    290                 295
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